

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT199/405KH	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2003/000792	International filing date (day/month/year) 23-10-2003	Priority date (day/month/year) 24-10-2002
International Patent Classification (IPC) or national classification and IPC G05B 21/00, G05B 23/00, D21F 11/00		
Applicant LIQUM OY et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 6 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☐ (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
- This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input checked="" type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

Date of submission of the demand 10-05-2004	Date of completion of this report 14-01-2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Ender Dag/MN Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (January 2004)

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ the international application as originally filed/furnished

☐ the description:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the drawings:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-7</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-7</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-7</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)**Documents cited in the International Search Report:**

D1: WO 0175222 A2
D2: US 2002/0052712 A1
D3: US 5 825 653 A
D4: US 3 490 689 A
D5: WO 03074784 A1 (Published 12/09/2003)

The applicant describes the problem of monitoring and analysing a production process from a large number of measured values. Prior art discloses learning neural networks to effectively classify large amounts of data and to reveal connections and groupings in measurements and large masses of data. The object of the present application is to analyse and monitor the cause of a large number of measured values more easily and accurately in a model phase, according to the applicant.

Document D1 discloses a method for monitoring and analyzing a paper manufacturing process, in which a large number of quantities are measured from the process. The measured quantities are entered as an input vector into a neural network, which in response produces an output vector as a continuous quantity. At least one fingerprint consistent with a good process situation in regard of an optimal output vector is determined and stored in memory. The stored fingerprints and fingerprints obtained in a normal process situation are compared substantially in real time. Based on the comparison a difference to be presented in a graphic form to the user is determined. The method is used to reveal a process moving away

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

from the optimal zone, well before problems appear (see page 1, lines 6-17, page 4, lines 1-12, page 5, lines 21-36, page 6, lines 18-32; figures 1, 2).

Document D2 discloses a method for the monitoring of a plant having a plurality of sub-systems. Measured values are detected for a fixed set of process parameters, which are used to prepare models for the operating characteristics of the sub-systems. The input and output values of each model being at least a part of the process parameters, and the model being optimised by comparing the model values with the measured values. A pre-check is carried out in prior to the determination if the operating parameters are within a pre-determined range (see [0012 - 0013], [0018 - 0020], [0040 - 0044]).

Document D3 and D4 represent the state of the art and describe two systems for controlling and regulating detected and recorded values of a plurality of variables in the machine sections.

D1 represents the closest prior art document. The difference between D1 and the claimed invention is that the claimed invention classifies input data in a process model phase, which refers to a specific process of a situation index. This reduces the need of a neural network, which classify input data in a teaching phase without any model created for every sub-process. This result is a deviation not only of one or two parameters but a deviation of the whole complex system.

The problem to be solved is to determine fingerprints of good process situations separately in several sub-processes and to detect a critical situation from one specific index according to deviation created for every sub-process. D2 shows a method for monitoring a plant having a plurality of models. These models depict each one process parameter and are created in a learning phase.

The problem to be solved in D2 does not address the same problem to be solved in the claimed invention. D2 describes the monitoring of a plant by a sub-system referred as a process parameter.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: BOX V

The problem of the claimed invention is to determine the cause of a problem in a paper production process quickly. An individual index is formed for each sub-process and a quality index for the entire paper machine is formed from the indexes.

Hence it is not obvious for a person skilled in the art to modify D1-D4 to solve the same problem as referred in the claimed invention.

The invention according to claims 1-7 is novel, industrial applicable and is considered to involve an inventive step.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2003/000792

Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
WO 03074784 A1	12/09/2003	05/03/2003	07/03/2002

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)